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THE FUTURE OF FRAMING

December 2009

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The mission of *Structural Building Components Magazine (SBC)* is to increase the knowledge of and to promote the common interests of those engaged in manufacturing and distributing structural building components. Further, *SBC* strives to ensure growth, continuity and increased professionalism in our industry, and to be the information conduit by staying abreast of leading-edge issues. *SBC*’s editorial focus is geared toward the entire structural building component industry, which includes the membership of the Structural Building Components Association (SBCA). The opinions expressed in *SBC* are those of the authors and those quoted, and are not necessarily the opinions of Truss Publications or SBCA.

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STRUCTURAL BUILDING COMPONENTS™ THE FUTURE OF FRAMING

Editor's Message

See Ya, 2009. No Really, You Can Leave Now!

by Steven Spradlin

A look back on the main events of 2009

I hesitate to say good riddance to a year that has been so personally rewarding for me. But from a business perspective, I can't wait to be done with 2009. No love lost. But before we put the year to bed, here are some industry highlights to look back on.

1. **BCMC.** Despite a bad year for business, nine people from my company made it to Phoenix, from our office manager to truss and wall technicians to salesmen. Guess what? They all took away something different. Here's what a few of them said:

"I now have a much better understanding of what SBCA is and what they do for our industry."

"I found the green building session very informative; I learned how points differ between rating systems."

"I enjoyed the show as a salesman. The discussion groups were really eye-opening in that we all seem to be sharing the same issues in these tough economic times. With +80% of the market stick framed [in Arkansas], we can use more brainstorming communications with peers to find ways to improve market penetration."

"I enjoyed the opportunity to go through the different booths and see the advances that are being made in our field. I also took advantage of a couple of seminars and found them very informative. However I was surprised more people didn't take advantage of them."

"The green building seminar was very informative. This has not taken off in our area as quickly as it has in other parts of the country. So it was a great opportunity to see what those who have more exposure to these issues have experienced."

"I'm a wall panel designer. I was very impressed with seeing the software advances. It was nice to see what we can look forward to in the future. I had never been to a BCMC before, but it was very enjoyable."

If you missed the show, turn to page 22 for the highlights.

You can join a Business Solutions Group for FREE! Fill out the survey at www.sbcindustry.com/BSG & you'll be added to a group.

2. **Business Solutions Groups.** They're ba-aaack! Join a group today and connect with companies just like yours across North America. In this very tough year, many of you told us you could use a peer group to exchange ideas and discuss trials or successes. Fill out a simple survey and you'll be matched up with a small group of non-competing manufacturers. For the first time ever, members of these groups will be invited to a Summit at the BCMC Show in 2010. And it's free! Sign up at www.sbcindustry.com/bsg.php.

3. **TTT Metric Level I.** In person and online, SBCA has offered Truss Technician Training for years. But it was originally written with standard measurements. Now we have a version for folks in Canada and elsewhere in the world (basically everywhere) where metric is used! Go to www.wtcatko.com/TTT1Metric for more information.

4. **CEUs.** Our goal is to have all design specifiers and building/fire officials come to SBCA for their continuing educational needs. Why? Because then they get the most current, up-to-date information on our industry! This year we have added to our large collection with Component Technology Workshops that include Overviews of Lumber, Metal Connector Plates, and Cold-Formed Steel Trusses. Check out all our CTWs at www.ttw.sbcindustry.com/TTWAll.php.

Continued on page 8

at a glance

- The nine people from my company took nine different things away from BCMC 2009.
- Stay connected with free Business Solutions Groups courtesy of SBCA.
- SBCA's Component Technology Workshops are a great way for design professionals and building/fire officials to get the most current information about our industry.

Editor's Message

Continued from page 7

The articles in this issue are about looking at our manufacturing processes from many different angles. Technical Q&A on page 10 addresses ripping truss chords, a practice that can significantly reduce lumber strength. Look for SBCA member Bill Bolduc's primer on fabrication tolerances on page 18—hopefully his words will inspire you to define your plant's tolerance.

Finally, what do you do when a 100-year-old silo loses its roof? Our cover story answers the question, spotlighting a creative truss application brought to us by framer-turned component manufacturer Jason Blenker, Blenker Building Systems. Check it out on page 14.

I'd like to end 2009 with a GREAT BIG THANK YOU to ***SBC*** advertisers and BCMC exhibitors. Your support of our industry allows us to keep bringing services and programs to companies like mine.

Best wishes for a healthy, safe and joyous holiday season. Join me in ringing in 2010! **SBC**

SBC Magazine encourages the participation of its readers in developing content for future issues. Do you have an article idea for a future issue or a topic that you would like to see covered? Email your thoughts and ideas to editor@sbcmag.info.

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International Code Council Code Development Hearings Update

The International Code Council (ICC) held its Code Development Hearing and Annual Conference in Baltimore, MD October 24 – November 11. During this process, the various ICC committees heard roughly 2,500 proposals for updates and changes to the codes. The proposals being heard will form the updated ICC codes for 2012.

SBCA staff monitored the process closely and provided testimony on several code proposals. In addition, SBCA Executive Director, Kirk Grundahl, served on the ICC's Structural Code Committee. The following proposals have a significant impact on the our industry:

Residential Building Code Proposal 13 (RB13)

Summary: Restores the scope of the International Residential Code (IRC) to include buildings up to 110 MPH. (Previously, the IRC scope was limited to buildings up to 100 MPH in hurricane-prone regions.)

Status: Approved by the Residential Building Committee

Residential Building Code Proposal 96 (RB96)

Summary: Adds the Cold-Formed Steel Building Component Safety Information (CFSBCSI) booklet as a reference in the steel floor and roof sections of the IRC.

Status: Approved

Residential Building Code Proposal 110 (RB110)

Summary: Adds language that allows sheathing joints on braced wall panels to be connected to separate studs, which are nailed together. Previously, the abutting sheathing panels were required to be fastened to a common stud.

Status: Approved

Residential Building Code Proposal 153 (RB153)

Summary: Modifies an applicability section for trusses to be more in line with the scope of the IRC and the steel truss section of the code.

Status: Approved

Residential Building Code Proposals 154 & 156 (RB154 and RB156)

Summary: Both of these proposals delete the 175 lbs. trigger for uplift connections. They allow toe-nailed connections for up to 200 lbs. (RB154) or 230 lbs. (RB156). Both proposals default trusses to the truss design drawings for uplift values.

Status: Both approved

Residential Building Code Proposal 31 (RB31)

Residential Building Code Proposal 31 (RB31) was introduced by the American Forest & Paper Association (AF&PA), which would require one-half inch gypsum on otherwise unprotected ceilings (unfinished basements) and provide an exception for conventional lumber. The modification was unilaterally supported by the National Association of Home Builders (NAHB) and would have created a competitive advantage for solid sawn lumber over components. Fortunately, SBCA was successful in convincing the IRC Committee to disapprove this proposal.

The proposals approved by the ICC committees during the Code Development Hearings will be heard at the 2010 Final Action Hearings. The items approved at the Final Action Hearings will then be incorporated into the 2012 I-Codes. **SBC**

correction:

The August 2009 Technical Q&A article, "Calculating Truss Uplift," contained information taken from a Technical Note on Cold-Formed Steel Construction published by the Cold-Formed Steel Engineers Institute (TN L200-09). However, we neglected to credit CFSEI or the primary author of this work, Sam Hensen, P.E., (Simpson Strong-Tie Co., Inc.) for their work. We apologize for the oversight and thank CFSEI and Hensen for calling it to our attention.

Technical Q & A

Ripping Lumber Will Likely Change the Grade

by Jim Vogt, P.E.

Why "ripping" lumber can negate grade and design values.

Cutting lumber for use in a truss is something that metal plate connected wood truss manufacturers are well accustomed to. Cross cutting and angle cutting are usually necessary to convert stocked lumber into pieces that fit the dimensional requirements of a truss. This type of cutting (i.e., across the width of the piece), seldom has any adverse affect on the grade of the lumber. Cutting or "ripping" lumber length-wise to create thinner or narrower lumber, however, almost always affects the grade, and typically requires the resulting pieces to be re-graded.

Question

I recently saw a picture in a construction magazine of a group of radius trusses in the roof of a building under construction. It appeared that the bottom chords in these trusses had been ripped to create the radius in the truss. I thought this type of cutting is not allowed. Am I mistaken?

Answer

As long as the grade, size and species of the ripped pieces of lumber used in these trusses meet or exceed the grade, size and species specified on the truss design drawing, what you have described is acceptable. It must be understood, however, that ripping lumber in this manner will very likely have an adverse affect on the grade, meaning that the resulting piece or pieces may no longer have the same grade and design values as the original piece.

Virtually all softwood lumber used for structural applications in the United States today is produced in accordance with U.S. Department of Commerce Voluntary Product Standard PS 20-05, American Softwood Lumber Standard. Section 7.3.7 of PS 20-05 states the following regarding ripped and resawn lumber:

> **7.3.7** Remanufacture (ripped, resawn or surfaced) of graded or grade marked lumber negates the grade or grade mark and the design values of the original product.

Resawn lumber is defined in Appendix B of PS 20-05 as:

> **Resawn lumber**–the product of sawing any thickness of lumber to develop thinner lumber.

Similarly, ripped lumber is defined as:

> **Ripped lumber**–the product of sawing any width of lumber to develop narrower lumber.

Grading rules for lumber consider the extent, location and number of various characteristics that determine the quality of piece of lumber. Two of the most common growth related characteristics found in lumber are knots and the grain deviation associated with them. Knots and grain deviation are considered "defects" because they tend to reduce the overall strength of a piece of lumber. The wood fibers in and around these natural growth characteristics are often oriented at radical angles to the fibers in the surrounding wood (Figure 1). Stresses resulting from loads applied to the lumber are generally transferred perpendicular to the fibers in and around the knot, instead of parallel to them. Since wood is considerably weaker across its grain than parallel to it, failure is often initiated in the knot or grain deviation at loads far below the capacity of straight-grained material (Figure 2). This is especially true when the knot and grain deviation are located in an area of high stress, such as near the edge of a joist or chord member subjected to bending stresses.

at a glance

- All softwood lumber used for structural applications in the United States today is produced in accordance with U.S. Department of Commerce Voluntary Product Standard PS 20-05.
- Grading rules for lumber consider the extent, location and number of various characteristics that determine the quality of piece of lumber.
- If it appears that ripping lumber is the only alternative, hire a certified lumber grader to re-grade the material.

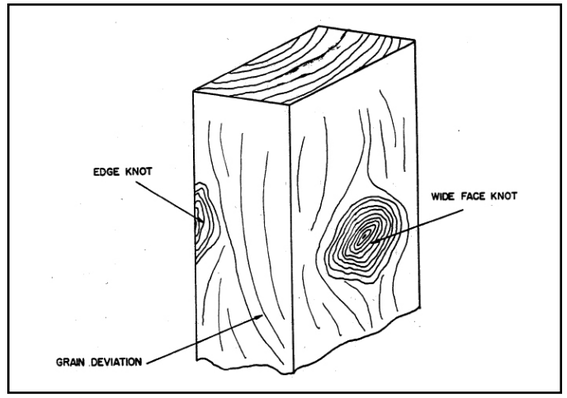

Figure 1. Sketch depicting knots and grain deviation in lumber.

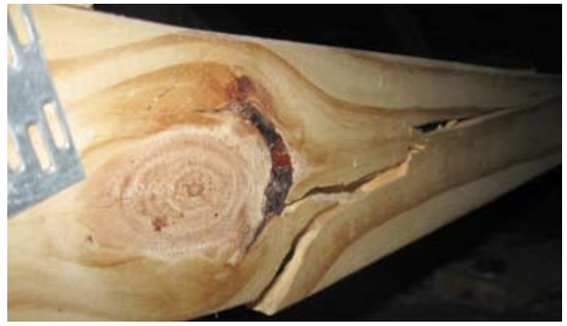

Figure 2. Failure in bottom chord of truss initiating in grain deviation around large wide face knot.

Ripping and resawing reduce the cross section of a piece of lumber. As a result, the extent (size) of any knots from the original piece that are now in the ripped or resawn piece(s) increases relative to the reduced section, and the location of these knots will also be typically closer to an edge or surface in the new piece. These changes are often significant enough to reduce the grade of the ripped or resawn piece(s) relative to the grade of the original piece.

Table 1 lists the maximum allowable knot size for four sizes and visual grades of sawn lumber. A review of this table indicates three important points. First, the maximum allowable size of a knot increases as the grade of the lumber decreases. Second, the maximum allowable size of a knot increases as the size of the lumber increases. Third, for a given grade and size of lumber, the maximum size of a knot located along the centerline of the wide face is greater than the maximum size of a knot located at the edge of the wide face. Stresses due to bending are greatest at the extremities (edges) of the lumber. Since knots and grain deviation tend to reduce the strength of a piece lumber, the size of a knot is more critical at or near the edge of the lumber than at or near its centerline. (See sidebar on page 12 for an example.)

Using the information in Table 1, we can quickly see how ripping a piece of lumber can reduce the grade of the remaining piece(s) relative to that of the original piece, based on knot size and location alone. Let's look at example.

Continued on page 12

	Select Structural		No. 1		No. 2		No. 3	
Lumber Size	Max. Knot at Edge of Wide Face	Max. Knot at Centerline of Wide Face	Max. Knot at Edge of Wide Face	Max. Knot at Centerline of Wide Face	Max. Knot at Edge of Wide Face	Max. Knot at Centerline of Wide Face	Max. Knot at Edge of Wide Face	Max. Knot at Centerline of Wide Face
2x4	3/4"	7/8"	1"	1-1/2"	1-1/4"	2"	1-3/4"	2-1/2"
2x6	1-1/8"	1-7/8"	1-1/2"	2-1/4"	1-7/8"	2-7/8"	2-3/4"	3-3/4"
2x8	1-1/2"	2-1/4"	2"	2-3/4"	2-1/2"	3-1/2"	3-1/2"	4-1/2"
2x10	1-7/8"	2-5/8"	2-1/2"	3-1/4"	3-1/4"	4-1/4"	4-1/2"	5-1/2"

Table 1. Maximum allowable knot sizes for selected grades and sizes of sawn lumber.

before

The joint of a truss in the Structural Building Components Research Institute (SCBRI) before the truss is tested. Note the knot on the edge of the bottom chord.

after

The truss fails at the spot of the knot, exposing a weakness in the lumber at that location.

Technical Q&A

Continued from page 11

Assume that a maximum of 3-3/4" is to be removed from a portion of a Select Structural 2x10 joist to create a desired architectural effect. The minimum depth of this piece after ripping will be 5-1/2". If the original 2x10 had the maximum allowable knot size of 2-5/8" at the centerline of the wide face and this knot happened to occur in the area where the ripped piece was now 5-1/2" deep, this 2-5/8" diameter knot would now be considered an edge knot in the ripped piece of lumber. A review of the table indicates that the highest grade of 2x6 lumber in which a 2-5/8" edge knot is allowed is No. 3—a considerable drop in grade. While this example is extreme, it illustrates the degrading effect that ripping lumber can have on the grade of the resulting piece(s) and why PS 20 requires that the pieces be re-graded.

If a component manufacturer is confronted with a situation in which ripping lumber may be required, what should he do? First, contact the truss design engineer to discuss the possible alternatives. Section 3.4.2 of ANSI/TPI 1-07 states:

3.4.2 Lumber Substitutions.
Truss lumber of a different grade shall be permitted if the substitute grade meets or exceeds the specified grade for each of the following engineering design properties:

(a) Reference design value for bending (F_b);
(b) Reference design value for tension (F_t);
(c) Reference design value for compression parallel to grain (F_c);
(d) Reference design value for compression perpendicular to grain ($Fc_\perp$);
(e) Reference design value for shear (F_v);
(f) Specific gravity (G);
(g) Reference modulus of elasticity (E); and
(h) Reference modulus of elasticity for stability calculations (E_{min}).

Any substitution of a specified Lumber grade not meeting the above requirements, or any substitution of a specified lumber grade to Structural Composite Lumber products shall require the review and approval of a Truss Designer.
(Underline added for effect)

If it appears that ripping lumber is the only alternative, hire a certified lumber grader to re-grade the material. SBC

To pose a question for this column, call the SBCA technical department at 608/274-4849 or email technicalqa@sbcmag.info.

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Silo Suite

by Libby Maurer

Blenker's motto: "We can do anything, the impossible just takes longer."

When someone has a crazy idea, we're not afraid to follow through..." Jason Blenker of Blenker Building Systems has always said this about his company. Their most recent job is no exception. This time, the crazy idea came from a very familiar customer—himself!

Blenker, an Amherst, WI native, bought an old farm property about five years ago. He and his wife raise horses, chickens and plan to add beef cows soon. Though the barn is functional, the couple planned a few renovations to increase space and restorations to maintain the character of the outbuildings.

For instance, the silo attached to the barn didn't have a roof for as long as Blenker can remember—it hadn't been used since the '60s. "It was either fix it and do something with it or tear it down. I decided I'd rather preserve it," Blenker said.

So Blenker sketched out a new trussed roof and handed it off to technician Don Rogers to design. But that's not all. "We debated putting just a roof on it. Then I thought it'd be cool to have a room underneath it," Blenker added. "That's what happens when business gets slow, you think of weird stuff to do," he said, making light of a slower-than-average year.

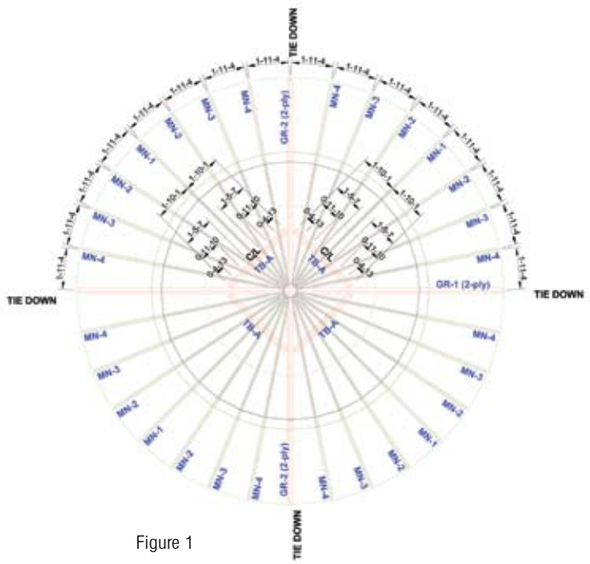

Figure 1

The result of having time on his hands is an impressive silo suite that measures 36' from the ground. At 13' in diameter, the room also has a 3'6" walkway around the outside that will eventually have a railing.

Truss technician Don Rogers was the lucky recipient of Blenker's sketch. Rather than start at the computer, however, Rogers had to begin in the shop. "Believe it or not the biggest obstacle was figuring out how to get the roof out the shop doors," he said. The doors are 14' tall, and Rogers knew the structure would exceed that height.

He determined the assembly would have to be designed so it could be separated into pieces and then assembled once it cleared the shop doors. First Rogers designed a 2-ply girder to run the radius of the roof—20'. This way the team could fasten the plies together in the shop (to make sure it fit together perfectly), but take them apart to get the two equal halves out the door. Next, he input two 2-ply girders to hit perpendicular to the main girder. Together, GR-1 and the GR-2s cut the roof into four congruent quarters (see Figure 1).

Twenty-eight mono trusses filled in the quarters (seven in each) creating the round shape of the roof. The monos came to a point to form the peak of the roof. "The restraint in trying to build something like this is that everything has to come together in the center, so there has to be something to carry the load of the trusses," Rogers explained. So Rogers added four 4' long truss beams at 45-degree angles to each girder to tie in the mono trusses.

Rogers said the roof was assembled as if it was one piece in the shop, including sheathing and shingles. "Then we unscrewed the long girder and tipped it on its side to get it on a trailer and wheeled out," he said. The halves were elevated on the ground so someone could get up inside and fasten the girder back together.

Project manager Rick Martin designed the walls and floor of the suite that would rest on the existing silo walls. First, he drew in the structural elements of the floor—two parallel 2-ply 6'x6' beams spanning the diameter of the assembly (see figure 2). Then he drew a perimeter around the center beams; the perimeter dimension equaled 13' plus 42" for the walkway outside the room. Martin drew in ten 6'x6' beams in the center of the parallel beams, dividing the floor into six sections on each side. He added 2'x6' members to each section for additional support. The beams are anchored to the silo and also allow for a hole in the middle of the platform for a staircase. Deck boards would eventually be nailed to the beams in the shop to form a platform.

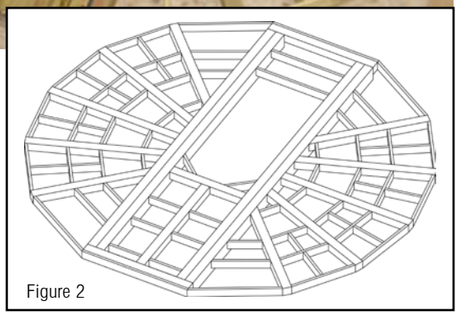

Figure 2

Next Martin, Rogers and Blenker put their heads together to figure out how to build the platform. "It was a challenge to accommodate the cantilevered floor around the room," Martin said, speaking to its size and awkward shape. Out on the shop floor, the crew cut and laid out the 6'x6' and 2'x6' beam pieces.

Continued on page 16

Silo Suite • Continued from page 15

Next, deck boards were placed on top and nailed in. Then they took a string line and traced the entire floor system using Martin's drawing as a template. "Once the lines were there, we cut the sheets out [to create the perimeter]," he said. This included cutting out a section in the middle of the platform for entrance to the room through the silo.

For the walls, Martin designed them in eight different sections, each with a window opening. The top and bottom plates were hand-cut in the shop from 4'x8' sheets of OSB. Once assembled, the walls were sheathed and sided in the shop.

Once at Blenker's farm, the crew maneuvered the crane into place. "Kind of a tight space to get into," Blenker said. "But we made sure to follow the SBCA Crane Safety Guidelines." (Blenker helped staff write the program.) First the floor assembly was craned into place on top of the silo. Then the room was placed on top of the floor. Next the roof was craned to the wall top plate.

How's the view from inside the tower? Not so fast—Blenker still has to build the stairs that will run up the middle of the silo. "Can't get up there yet," he said. Blenker says he has no idea what he'll do with the silo suite. With a seven-month-old baby in their lives, the Blenkers should have no problem finding a use for their new space. **SBC**

Send pictures and details of your interesting design project to editor@sbcmag.info.

Hey Truss Manufacturer, What's Your Fabrication Tolerance?

by Bill Bolduc, P.E., S.E.

What's your fabrication tolerance? Be prepared to answer this question. If you have not been asked yet, there is a good chance you will be asked in the near future. When you confidently answer this question in a clear and succinct manner, you show that you are a quality manufacturer that is in control of design and fabrication.

This question will likely come from several sources and different people in your company will be asked at various times.

- Your plant personnel will be asked by your Third Party Quality Inspector/ Auditor.
- Your truss design manager and truss technicians will be asked by the firm that provides you sealed truss design drawings.
- The people setting up the truss design software will be asking this question.
- The plan examiner from the building department will be asking this question.
- Field inspectors from the building department will be asking this question.
- Over time even framing contractors and home builders will be asking this question.
- In the event of a claim or lawsuit, you may even be asked by an attorney. See sidebar below.

The Fabrication Tolerance: A Simple Concept

The concept of the Fabrication Tolerance was introduced in ANSI/TPI 1-2002 National Design Standard for Metal Plate Connected Wood Truss Construction. ANSI/TPI 1-2002 is the reference standard for metal plate connected wood trusses in the 2003 and 2006 versions of the International Residential Code® and International Building Code® (IBC). The concept is simple. Each truss manufacturer establishes a tolerance that is used for the plated connections in the trusses that are manufactured. This tolerance is used in two places:

1. The in-plant quality control process uses the Fabrication Tolerance as a clear criterion for the pass/fail of any joints selected for inspection.

2. The engineering of the truss plates on the truss design drawings are adjusted to allow for imperfections allowed within the Fabrication Tolerance.

SBCA Legal Counsel Kent Pagel warns about the legal implications of establishing a consistent Fabrication Tolerance:

"There ought to be significant legal concerns on the part of any component manufacturer where the Fabrication Tolerances shown on the truss design drawings are less than the Fabrication Tolerances used by the manufacturer for their quality control procedures. The argument that would be later advanced in the event of a collapse, product fall-down or construction defect case would simply be that the design assumes a certain quality of manufacturing and that was not met and is most likely the cause of the [failure/defect]. A 3rd party inspection agency should likewise be concerned as they would be viewed in a litigation or arbitration as the entity responsible to regulate manufacturers who ignore the rules."

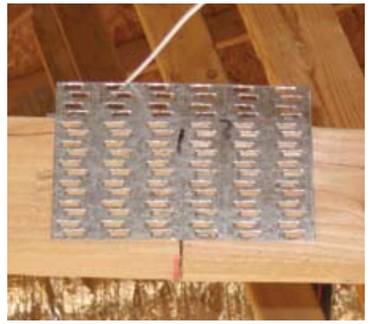

Figure 1. Plate misplacement. Engineering specified bottom edge of plate at the bottom edge of the chord.

Figure 2. Pitch-pocket under plate area.

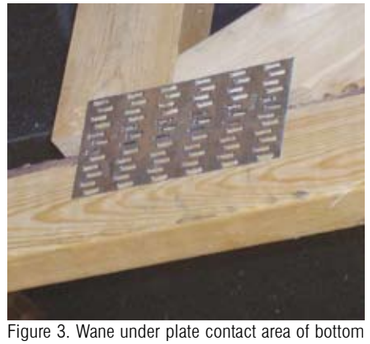

Figure 3. Wane under plate contact area of bottom chord.

Obviously, the same Fabrication Tolerance must be used in both the in-plant quality control and on the truss design drawings. To keep this coordinated, ANSI/TPI 1 requires that this information be stated on each truss design drawing. Some plate sizes used will be affected by the Fabrication Tolerance.

What is the Fabrication Tolerance?

The Fabrication Tolerance is the percentage of the plate contact area on a given member of a joint that is allowed to be ineffective due to any of the following conditions:

- the position of the metal connector plate on the joint
- the embedment of the teeth into the wood
- the quality of the lumber at the contact area under the metal connector plate

The occurrence of any of these conditions will reduce the strength of the connection:

- If the plate is positioned differently from what is specified on the truss design drawing, one or more of the members in the joint will have fewer teeth and less strength than intended by the truss design drawing. (See Figure 1)
- If there is a small gap (embedment gap) between the metal plate and the wood surface, the strength of the connection is reduced. The ANSI/TPI 1 standard allows a gap up to and including 1/32" before some reduction in capacity must be considered. (See Table 1) If any teeth are flattened (i.e., not embedded perpendicular to the wood surface) the capacity is reduced.
- If a lumber characteristic, such as a knot, wane, or pitch pocket, is under the plate contact area, the strength of the connection is reduced. (See Figures 2 and 3) This can occur even if the lumber is the correct grade specified on the truss design drawing. For example, #2 Grade of structural light framing lumber typically allows wane to be up to ½ the width of the member for up to ¼ the length of the member. Although this is acceptable for many structural uses, it would usually be unacceptable for one half of a member width under the plate contact area to be into wane.

Tooth Embedment Gap, G	G=0"	0"< G ≤ 1/32"	1/32"< G ≤ 1/16"	1/16"< G ≤ 3/32"	G > 3/32"
Tooth Effectiveness	119%	100%	60%	40%	0%

Table 1. Tooth Effectiveness with Various Embedment Gaps

What's Your Fabrication Tolerance?

Continued from page 19

A Simple Concept Became Overly Complicated

The first attempt to formalize the Fabrication Tolerance concept was in ANSI/TPI 1-2002. This version of the standard used the Quality Control Factor, or C_q, to adjust plate holding values for the corresponding Fabrication Tolerance established by the truss manufacturer. C_q was designed to be similar to the load duration factor in that a normal value (for roof trusses) was typically 1.00 (this represented a 20 percent reduction in plate holding values) and in some cases it could be increased up to 1.25 (this represented no reduction in plate holding values). ANSI/TPI 1-2002 requires that C_q be shown on the truss design drawing. This presentation of C_q was confusing to most of us.

The good news is that the industry realized the confusion caused by the way C_q was initially presented and improved things in ANSI/TPI 1-2007. In the 2007 version, the Fabrication Tolerance was clarified and brought to the forefront. The Fabrication Tolerance is now required to be shown on the truss design drawing per ANSI/TPI 1-2007. ANSI/TPI 1-2007 no longer requires C_q on the truss design drawing since it can be determined from the Fabrication Tolerance.

The value of C_q was also changed in the 2007 version. Table 2 shows how each of these relates to the Fabrication Tolerance. If someone asks "What's your quality control factor?", you should answer in terms of your Fabrication Tolerance. You will also need to explain the relationship between C_q and the Fabrication Tolerance per Table 2.

Most of the software for metal plate connected wood trusses designed in accordance with ANSI/TPI 1-2007 now places the Fabrication Tolerance on the truss design print-out. The entire truss might be designed with one Fabrication Tolerance for all joints, or a separate Fabrication Tolerance might be assigned on a per joint basis depending on design restraints (see the exceptions below).

What Is the Correct Value for the Fabrication Tolerance?

There is no single correct value. The correct value is the value that has been established by the truss manufacturer. That is why you must be prepared to answer: "What's your Fabrication Tolerance?".

It depends on the quality control procedures used by the truss manufacturer. The Fabrication Tolerance may be any value from 0% to 30% (or even higher). What is important is that the Fabrication Tolerance shown on the truss design drawings matches (or exceeds) the Fabrication Tolerance used by the truss manufacturer for their quality control procedures. The third party agency that audits the plant's quality control procedures must also agree that the quality procedures ensure results that justify the Fabrication Tolerances shown on the truss design drawings.

Typically, truss manufacturers will use a more liberal Fabrication Tolerance for roof trusses (plates embedded into the wide face of the lumber) than for floor trusses (with plates embedded into the narrow edge of the lumber). This is due to the greater geometric complexity of roof trusses and the manufacturing process that may require placement of a truss plate on the underside of the connection for roof trusses.

If the Fabrication Tolerance is less than 20% for roof trusses (plates into wide face) or less than 11% for floor trusses (plates into narrow edge), the ANSI/TPI 1-2002 (Section 3.2.4.2) requires that "... the Truss Manufacturer shall provide to the approved inspection agency, or through other means, justification ..." for the lower Fabrication Tolerance. ANSI/TPI 1-2007 does not have this requirement. See Table 2 for the relationship between the Fabrication Tolerance and the Quality Control Factor, C_q.

Fabrication Tolerance	Quality Control Factor, C_q	
	Per ANSI/TPI 1-2002	Per ANSI/TPI 1-2007
0%	1.25	1.00
10%	1.125	0.90
11%	1.11	0.89
20%	1.00	0.80
30%	0.875	0.70

Table 2. Equivalent Quality Control Factor for Various Fabrication Tolerances

Are There Any Exceptions?

If a joint cannot be plated with the normal inventory of plates, most truss design software will allow an exception. An attempt can by made to specify a plate with a lower Fabrication Tolerance than normally specified by the truss manufacturer. In this case ANSI/TPI 1 requires that the truss design drawing show that an exception was taken.

The truss design drawing must indicate that the joint was designed using a modified Fabrication Tolerance. The truss manufacturer must recognize this and apply the required additional quality criteria to this joint.

References in the Building Code

The 2003, 2006 and 2009 versions of the IBC successively include more guidance as to the minimum information to be submitted to the building department for plan review and inspection of projects involving wood trusses. Each of these codes references the ANSI/TPI 1 standards. The 2003 and 2006 versions reference ANSI/TPI 1-2002, while the 2009 version references ANSITPI 1-2007. The 2006 IBC Section 2303.4.2 states that the requirements of the ANSI/TPI 1 must be met in addition to the requirements stated in the IBC.

Conclusion

The 2002 and 2007 editions of ANSI/TPI 1 have significantly improved and clarified the quality requirements for metal plate connected wood truss construction. As building designers, building owners, code officials and contractors learn more about these changes, they will ask questions. If you are prepared with clear answers you will show that you are a quality manufacturer that is in control of the design and fabrication of wood trusses. SBC

William Bolduc, P.E., S.E. is a Structural Engineer for A.C. Houston Lumber Company and an expert on several aspects of wood-frame construction. A Professional Engineer in 27 states and a Structural Engineer in Nevada, Utah, and Texas, Bill received a Bachelor Degree in Civil Engineering from the Illinois Institute of Technology and is receiving a Masters Degree from the University of Nevada Las Vegas.

What's Your Fabrication Tolerance?*

"We recently reviewed all of the settings in the software used to select plates. We had access to a knowledgeable person from our plate supplier to help us understand the details. Our TPI QC Fabrication Tolerance is set to 20% for roof trusses and 11% for floor trusses."

–Joe Butcher, P.E. • Vice President • Heart Truss & Engineering • Lansing, MI

"We use a tolerance of 20% for roof trusses and 11% for floor trusses. This provides a good balance between plate sizes and economy. It also works well with our In-Plant WTCA QC process."

–Glenn McClendon • Vice President • Sun State Components of Nevada

*Editor's Note: The tolerances given are not intended to be a representative sample.

BCMC 2009 RECAP

Industry Gathers in Phoenix to BUILD COMMUNITY, MAKE CONNECTIONS

by SBC Staff

Phoenix played host to the 2009 BCMC Show September 30 through October 2, where folks from the building components industry came to Build Community and Make Connections. Attendees know that even in a down year, BCMC is the place to be if you want to stay connected with the industry--and this year it has never been more important. The mood was upbeat and optimistic ...everyone's ready to turn the page and start rebuilding!

Let's take a look back at what we learned at BCMC 2009.

BCMC: Building Community, Making Connections

LOYALTY PAYS FOR 68

It was the fifth year of the BCMC Loyalty Rewards Program, recognizing 68 long-time attendees for their continued support of the show. Loyal Attendees are defined as folks who attended BCMC 5 out of the last 7 years and whose companies are members of SBCA.

It really does pay to be a Loyal Attendee. They received extra tickets to the new Mega Giveaway and the BCMC Bowl. They also qualify for lowest member pricing for publications, services and products ordered at the BCMC booth—a tremendous savings! Each Loyal Attendee receives a pin to display proudly.

THANKS FOR SHOWING YOUR LOYALTY TO THE BCMC SHOW!

Building Community

Our industry builds more than components...we help build communities too. At BCMC, we watched community-building in action as peers encouraged each other to learn, grow and innovate. Exchanging of good ideas and business practices were on the top of the list for attendees this year. Nobody left the show empty-handed!

Making Connections

As the industry is evolving, many came to the show to learn strategies and ways to solve their toughest challenges. By networking with industry professionals and suppliers who are facing similar situations, they left the show with some interesting and innovative ways of overcoming obstacles. BCMC is more than just a machinery show, it's a place for the industry to get together and challenge expectations, confront solutions, and dare to succeed!

NFL Star Opens Show

The show opened with a motivational presentation by NFL star Tom Flick. His message resonated with the audience and inspired many to find ways to improve themselves and their businesses. "Tom Flick was awesome – the best in 18 years of BCMC!" noted Wayne Beebe (Oregon Truss/Dominion Truss).

Sessions Galore!

The educational sessions and roundtables this year included hard-hitting topics for truss technicians, salesmen, steel truss manufacturers, green building enthusiasts, and people looking to introduce new technologies in the marketplace or improve the way they market their businesses. Check out a couple of the best attended presentations.

Bashing Tradition

The three-part session given by Ken Cloyd and Barry Dixon was a true crowd pleaser. Both innovators in their own right, Cloyd and Dixon talked about ways component manufacturers can introduce new ideas to the marketplace. They urged attendees to find new ways to add value, market and sell products. "Barry's ability to think outside the box and create an environment conducive to speaking frank made it especially worthwhile," said Jesse Lohse (Rocky Mountain Truss).

High Performance Designers

Chip Dean and Bill Bolduc led a pair of sessions geared toward tips for improving design departments. The audience responded positively to the duo's suggestions. "Chip knows designers. Glad to see a champion for technicians. Bill was very helpful with his PE outlook. Excellent session," said Kevin Harold (Koehlinger Engineering).

Continued on page 24

MESSAGE FROM THE 2010 CHAIR

After peaking in January 2006, new housing starts declined drastically hitting bottom in April 2009. This has been the longest and deepest decline our industry has experienced in 50 years.

But positive signs have finally appeared! Unsold inventories are down and housing starts are on the upswing. After surviving the worst housing construction downturn, make sure you're prepared for the revival of our industry at "Revvin' Up and Gaining Momentum," the 2010 BCMC Show. Plan now to attend the component industry's leading tradeshow as we revisit Charlotte from September 29 through October 1, 2010.

BCMC 2010 promises to deliver solutions for your business—from new products to the latest in software and leading edge equipment. Learn how to prosper in the "new normal" of smaller home sizes and starts by increasing your products and services. Explore ways of reinventing your business, adding value, differentiating yourself from the competition. Embrace the latest technologies to meet the challenges of doing more with less. Certainly we all have learned from the pain of the past 3+ years. Come visit your colleagues and learn what worked (and what didn't), to allow them to survive. Share your experiences. There is no better time or place than Charlotte this coming fall. Hope to see you there!

— Bob Allen • 2010 BCMC Chair
ITW Building Components Group

BCMC 2009 Recap

Continued from page 23

3rd Annual Chapter Competition

First place went to the home team of SBCA - Arizona with 56% of the chapter in attendance! Each member at BCMC won a commemorative pin. The chapter was also awarded 10 Component Technology Workshops to distribute in their marketplace. This year's runner-up was the Mid South Chapter with 44% of its membership in attendance.

Economic Forecast

Economist Stan Duobinis delivered his forecast Friday to a room of attendees eager to hear what 2010 will have in store. Duobinis predicted that the recession is finally over, yet unemployment will continue to lag through next year as we emerge from the current situation. He indicated that home prices are beginning to bounce back, and most of the country will post housing start gains in 2010. "Stan's enthusiasm and positive attitude toward a bad and depressing subject was the best part of the session," commented Mike Beebe (Reno Truss). "He's excellent," agreed Jeb Syler (Dansco Engineering). "Just keep him coming back every year!" SBC

FOR A COMPLETE RECAP OF THIS YEAR'S SHOW, INCLUDING EXHIBITOR CONTACT INFORMATION, GO TO WWW.SBCMAG.INFO/BCMC09RECAP

For reader service, go to www.sbcmag.info/panelsplus.htm

Parting Shots

Share your stories and photos with us! Send submissions to **partingshots@sbcmag.info**.

For seven hikers, BCMC ended with an exciting journey to one of the greatest western landmarks. Gary Weaver from Timber Tech Texas organized a 16-mile daylong hike into the Grand Canyon... dipping their toes in the Colorado River at the bottom. An avid trekker who has hiked the Canyon trails many times, Weaver invited BCMC attendees to join him on the 14-hour hike starting at the South Kaibab trailhead on the Saturday after the show.

Pictured at left (from left to right) is Keith Lindemulder, Sonet LeRoux, Gary Weaver and Todd Drummond. Hikers Phil Adams, Greg Leslie and Ed Williams are pictured at right. Friend Jim Mavrakes caught up with the group at the trailhead to take their pictures early in the morning. Weaver is extremely proud of the event: "It was a mixture of pain, glorious views, pain, excitement, pain, fun."

The group finished their climb out of the Canyon on Bright Angel Trail a little after sunset. "We are feeling the truss business is not so difficult after all," Weaver wrote. Nothing like a trip to the Grand Canyon to put 2009 into perspective. **SBC**

For reader service, go to www.sbcmag.info/itw.htm

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